

From: [John Garnham](#)
To: [Ana Maria Maxey](#)
Subject: FW: Follow up BART - Status Air Supply Life Cycle Test Mattei
Date: Thursday, August 22, 2019 7:11:42 AM
Attachments: [image001.png](#)
[Q-ASU-025R-02.pdf](#)

From: Pierre Alexandre Beaumont <pierre_alexandre.beaumont@rail.bombardier.com>
Sent: Tuesday, November 20, 2018 7:37 AM
To: Frank Kiraly <fkiraly@bart.gov>
Cc: Henry Kolesar <hkolesa@bart.gov>; John Garnham <JGarnha@bart.gov>; 071 Project Management <071Project.Management@rail.bombardier.com>; New Vehicle Procurement <bnvp@bart.gov>; Jean Boucher <jean.boucher@rail.bombardier.com>
Subject: FW: Follow up BART - Status Air Supply Life Cycle Test Mattei

Hi Frank,

Please see attached the report from MATTEI. It included the modification done to the unit recently.

Let me know If you have questions or want to see additional data.

Thanks

PA

Pierre Alexandre
x6296

From: Bruce Berlage <bberlage@matteicomp.com>
Sent: 20 novembre 2018 10:02
To: Pierre Alexandre Beaumont <pierre_alexandre.beaumont@rail.bombardier.com>; Caroline Nadeau <caroline.nadeau@rail.bombardier.com>
Cc: James Cronin <james.cronin@rail.bombardier.com>; Jean Boucher <jean.boucher@rail.bombardier.com>; David Vallee <david.vallee@rail.bombardier.com>; Stephanie Robitaille <stephanie.robitaille@rail.bombardier.com>; Stephanie Robitaille <stephanie.robitaille@rail.bombardier.com>; 'Doug Franz' <dfranz@matteicomp.com>; 'Jay Hedges' <jhedges@matteicomp.com>
Subject: RE: Follow up BART - Status Air Supply Life Cycle Test Mattei

Hi Pierre Alexandre,

Please see attached for the interim report requested by your customer.

Best regards,
Bruce

Bruce Berlage, Jr.

Electromechanical Engineer

Mattei Transit Engineering

9635 Liberty Road, Suite E, Randallstown, MD 21133

Office: +410.521.7020 Fax: 410.521.7024

Email: bberlage@matteicomp.com Web: www.matteicomp.com/transit-engineering/

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From: Pierre Alexandre Beaumont <pierre_alexandre.beaumont@rail.bombardier.com>

Sent: Monday, November 12, 2018 4:51 PM

To: Bruce Berlage <bberlage@matteicomp.com>; Caroline Nadeau <caroline.nadeau@rail.bombardier.com>

Cc: James Cronin <james.cronin@rail.bombardier.com>; Jean Boucher <jean.boucher@rail.bombardier.com>; David Vallee <david.vallee@rail.bombardier.com>; Stephanie Robitaille <stephanie.robitaille@rail.bombardier.com>; Stephanie Robitaille <stephanie.robitaille@rail.bombardier.com>; amurgia@matteicomp.com; 'Doug Franz' <dfranz@matteicomp.com>; 'Jay Hedges' <jhedges@matteicomp.com>

Subject: RE: Follow up BART - Status Air Supply Life Cycle Test Mattei

Hi Bruce,

Thanks for the reply. Can we get this before November 22nd 2018 ?

Pierre Alexandre
x6296

From: Bruce Berlage <bberlage@matteicomp.com>

Sent: 9 novembre 2018 17:19

To: Pierre Alexandre Beaumont <pierre_alexandre.beaumont@rail.bombardier.com>; Caroline Nadeau <caroline.nadeau@rail.bombardier.com>

Cc: James Cronin <james.cronin@rail.bombardier.com>; Jean Boucher <jean.boucher@rail.bombardier.com>; David Vallee <david.vallee@rail.bombardier.com>; Stephanie Robitaille <stephanie.robitaille@rail.bombardier.com>; Stephanie Robitaille <stephanie.robitaille@rail.bombardier.com>; amurgia@matteicomp.com; 'Doug Franz' <dfranz@matteicomp.com>; 'Jay Hedges' <jhedges@matteicomp.com>

Subject: RE: Follow up BART - Status Air Supply Life Cycle Test Mattei

Pierre Alexandre,

To date the total running time equates to 8,428 hours.

You will note that there was significant down-time in September while the Unit Under Test was undergoing maintenance and retesting. After discussions between Caroline and Jay in October, Mattei has taken additional steps to address the down-time issue in the long-life test by ensuring that the maintenance is scheduled in advance and that the personnel that are needed are prioritizing to be available in advance to be ready to service the unit when it is brought inside.

Per the request from your customer (Frank), Mattei will provide an update to our interim report in a couple of weeks.

Best regards,

Bruce

Date	Running time (h)
2018-09-01	7764
2018-10-01	7773
2018-11-01	8428
2018-12-01	
2019-01-01	
2019-02-01	
2019-03-01	
2019-04-01	
2019-05-01	
2019-06-01	
2019-07-01	
2019-08-01	
2019-09-01	
2019-10-01	
2019-11-01	
2019-12-01	
2020-01-01	
2020-02-01	
2020-03-01	

Bruce Berlage, Jr.

Electromechanical Engineer

Mattei Transit Engineering

9635 Liberty Road, Suite E, Randallstown, MD 21133

Office: +410.521.7020 Fax: 410.521.7024

Email: bberlage@matteicomp.com Web: www.matteicomp.com/transit-engineering/

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From: Pierre Alexandre Beaumont <pierre_alexandre.beaumont@rail.bombardier.com>
Sent: Thursday, November 8, 2018 1:23 PM
To: Caroline Nadeau <caroline.nadeau@rail.bombardier.com>; Tony Murgia <amurgia@matteicomp.com>; 'Bruce Berlage' <bberlage@matteicomp.com>
Cc: James Cronin <james.cronin@rail.bombardier.com>; Jean Boucher <jean.boucher@rail.bombardier.com>; David Vallee <david.vallee@rail.bombardier.com>; Stephanie Robitaille <stephanie.robitaille@rail.bombardier.com>; Stephanie Robitaille <stephanie.robitaille@rail.bombardier.com>
Subject: RE: Follow up BART - Status Air Supply Life Cycle Test Mattei
Importance: High

Hello all,

I haven't seen an update to the table below. Where do we stand in term of hours now ?

Also the customer (Frank) is asking for an interim report. Could MATTEI provide such a report in the next weeks? BART is asking for special focus on the modifications that were done to correct the oil leaks and how is the test progressing.

MATTEI provided such a report a year or so ago, so they are expecting an update of the report.

Thanks and please confirm shortly

PA

Pierre Alexandre
x6296

From: Caroline Nadeau
Sent: 15 octobre 2018 07:25
To: Tony Murgia <amurgia@matteicomp.com>; 'Bruce Berlage' <bberlage@matteicomp.com>
Cc: James Cronin <james.cronin@rail.bombardier.com>; Jean Boucher <jean.boucher@rail.bombardier.com>; Michael Lapointe <michael.lapointe@rail.bombardier.com>;
Stephanie Robitaille <stephanie.robitaille@rail.bombardier.com>; Pierre Alexandre Beaumont <pierre_alexandre.beaumont@rail.bombardier.com>; Caroline Nadeau <caroline.nadeau@rail.bombardier.com>; Stephanie Robitaille <stephanie.robitaille@rail.bombardier.com>
Subject: Follow up BART - Status Air Supply Life Cycle Test Mattei

Hello Tony and Bruce.

We have not received an answer from you and whish a confirmation on the below request?

Best regards,

Caroline Nadeau
AME Commodity Buyer
Operating & Passenger Systems
Office: 450 441-3168
Caroline.nadeau@rail.bombardier.com



De : Pierre Alexandre Beaumont

Envoyé : 25 septembre 2018 13:17

À : Caroline Nadeau <caroline.nadeau@rail.bombardier.com>; Tony Murgia <amurgia@matteicomp.com>; 'Bruce Berlage' <bberlage@matteicomp.com>

Cc : James Cronin <james.cronin@rail.bombardier.com>; Jean Boucher <jean.boucher@rail.bombardier.com>; Michael Lapointe <michael.lapointe@rail.bombardier.com>; Stephanie Robitaille <stephanie.robitaille@rail.bombardier.com>

Objet : RE: BART - Status Air Supply Life Cycle Test Mattei

Hello,

Did we has confirmation for that ?

Thanks

PA

Pierre Alexandre
x6296

From: Caroline Nadeau

Sent: 14 septembre 2018 12:40

To: Tony Murgia <amurgia@matteicomp.com>; 'Bruce Berlage' <bberlage@matteicomp.com>

Cc: Pierre Alexandre Beaumont <pierre_alexandre.beaumont@rail.bombardier.com>; James Cronin <james.cronin@rail.bombardier.com>; Jean Boucher <jean.boucher@rail.bombardier.com>; Michael Lapointe <michael.lapointe@rail.bombardier.com>; Stephanie Robitaille <stephanie.robitaille@rail.bombardier.com>; Caroline Nadeau <caroline.nadeau@rail.bombardier.com>

Subject: TR: BART - Status Air Supply Life Cycle Test Mattei

Hello Tony

As per your attached report, Mattei is stating that the Life Cycle test to be finish by Feb 2019 will be completed by March 2020.

Mattei's input :

- To date the total running time equates to: 7,764 hours.
- Subtracting this from the required 5-year total running time (18,250 hours), leaves a balance of 10,486 hours.
- Based on operating the equivalent of 141 hours per week and shutting down during Christmas/New Year's, we estimated the completion date for the test will be March 2020.

Will it be possible to be updated with your progression with the below table?

Date	Running time (h)
2018-09-01	7764
2018-10-01	
2018-11-01	
2018-12-01	
2019-01-01	
2019-02-01	
2019-03-01	
2019-04-01	
2019-05-01	
2019-06-01	
2019-07-01	
2019-08-01	
2019-09-01	
2019-10-01	
2019-11-01	
2019-12-01	
2020-01-01	
2020-02-01	
2020-03-01	

Thank you

Caroline Nadeau
AME Commodity Buyer

Operating & Passenger Systems
Office: 450 441-3168
Caroline.nadeau@rail.bombardier.com



From: Tony Murgia <amurgia@matteicomp.com>
Sent: 22 mars 2017 20:03
To: Pierre Doyon <pierre.doyon@rail.bombardier.com>
Cc: Jean Francois Boucher <jean_francois.boucher@rail.bombardier.com>; Pierre Alexandre Beaumont <pierre_alexandre.beaumont@rail.bombardier.com>; 'Bruce Berlage' <bberlage@matteicomp.com>
Subject: RE: BART - Status Air Supply Life Cycle Test

Pierre;

Attached is the interim report for the BART ASU Life Cycle Test.

Sorry for the delay and thank you for your patience.

Regards,
Tony

Tony Murgia
Program Manager
Mattei Transit Engineering
9635 Liberty Road, Suite E, Randallstown, MD 21133
Office: +410.521.7020 Fax: 410.521.7024
Email: amurgia@matteicomp.com Web: www.matteicomp.com/transit-engineering/

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From: Pierre Doyon [<mailto:pierre.doyon@rail.bombardier.com>]
Sent: Wednesday, March 22, 2017 9:58 AM
To: Tony Murgia <amurgia@matteicomp.com>
Cc: Jean Francois Boucher <jean_francois.boucher@rail.bombardier.com>; Pierre Alexandre Beaumont <pierre_alexandre.beaumont@rail.bombardier.com>; Bruce Berlage <bberlage@matteicomp.com>
Subject: RE: BART - Status Air Supply Life Cycle Test

Hi Tony,

As mentioned below, we now need to submit your summary report to BART. It does not need to be lengthy: *"BART wants to have the progress, issues encountered since the last witness and the*

expected finish date". Can you please submit by early today ?

Thanks and regards,

Pierre.

Pierre Doyon

Project Administrator, BART project

Supply Management

Bombardier Transportation

1101 Parent Street

St-Bruno, Quebec J3V 6E6

Tel. 450-441-3054

pierre.doyon@rail.bombardier.com

From: Pierre Doyon

Sent: Tuesday, March 21, 2017 9:30 AM

To: 'Tony Murgia' <amurgia@matteicomp.com>

Cc: Jean Francois Boucher <jean_francois.boucher@rail.bombardier.com>; Pierre Alexandre

Beaumont <pierre_alexandre.beaumont@rail.bombardier.com>; 'Bruce Berlage'

<bberlage@matteicomp.com>

Subject: RE: BART - Status Air Supply Life Cycle Test

Hi Tony,

Ref. below, aligned for today ?

Thanks and regards,

Pierre.

Pierre Doyon

Project Administrator, BART project

Supply Management

Bombardier Transportation

1101 Parent Street

St-Bruno, Quebec J3V 6E6

Tel. 450-441-3054

pierre.doyon@rail.bombardier.com

From: Pierre Doyon

Sent: Friday, March 17, 2017 8:32 AM

To: 'Tony Murgia' <amurgia@matteicomp.com>

Cc: Jean Francois Boucher <jean_francois.boucher@rail.bombardier.com>; Pierre Alexandre

Beaumont <pierre_alexandre.beaumont@rail.bombardier.com>; Bruce Berlage

<bberlage@matteicomp.com>

Subject: RE: BART - Status Air Supply Life Cycle Test

Hi Tony,

Thanks for below. I will need your summary by COB Tuesday. Can you please align accordingly ?

Regards,

Pierre.

Pierre Doyon

Project Administrator, BART project

Supply Management

Bombardier Transportation

1101 Parent Street

St-Bruno, Quebec J3V 6E6

Tel. 450-441-3054

pierre.doyon@rail.bombardier.com

From: Tony Murgia [<mailto:amurgia@matteicomp.com>]

Sent: Thursday, March 16, 2017 4:34 PM

To: Pierre Doyon <pierre.doyon@rail.bombardier.com>

Cc: Jean Francois Boucher <jean_francois.boucher@rail.bombardier.com>; Pierre Alexandre

Beaumont <pierre_alexandre.beaumont@rail.bombardier.com>; Bruce Berlage

<bberlage@matteicomp.com>

Subject: RE: BART - Status Air Supply Life Cycle Test

Pierre;

Yes we can prepare the summary report. We will submit it within the next few days.

Regards,

Tony

Tony Murgia

Program Manager

Mattei Transit Engineering

9635 Liberty Road, Suite E, Randallstown, MD 21133

Office: +410.521.7020 Fax: 410.521.7024

Email: amurgia@matteicomp.com Web: www.matteicomp.com/transit-engineering/

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From: Pierre Doyon [<mailto:pierre.doyon@rail.bombardier.com>]
Sent: Thursday, March 16, 2017 4:20 PM
To: Tony Murgia <amurgia@matteicomp.com>
Cc: Jean Francois Boucher <jean_francois.boucher@rail.bombardier.com>; Pierre Alexandre Beaumont <pierre_alexandre.beaumont@rail.bombardier.com>
Subject: FW: BART - Status Air Supply Life Cycle Test

Hi Tony,

I know we spoke about this earlier this afternoon, but I just got the request below. Can you please provide me with a brief summary ?

Thanks and regards,

Pierre.

Pierre Doyon
Project Administrator, BART project
Supply Management
Bombardier Transportation
1101 Parent Street
St-Bruno, Quebec J3V 6E6
Tel. 450-441-3054
pierre.doyon@rail.bombardier.com

From: Pierre Alexandre Beaumont
Sent: Thursday, March 16, 2017 3:42 PM
To: Pierre Doyon <pierre.doyon@rail.bombardier.com>
Cc: Jean Francois Boucher <jean_francois.boucher@rail.bombardier.com>
Subject: BART - Status Air supply

Salut Pierre,

Can you please give ask Mattei for a short update on the Air Supply Life cycle test ?

BART wants to have the progress, issues encountered since the last witness and the expected finish date.

Thanks

PA

Pierre Alexandre Beaumont, eng.
Project Engineer – BART Engineering Project Management
Bombardier Transport - America
pierre_alexandre.beaumont@rail.bombardier.com

office: +1 450 441 2020 x-6296

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Interim Life-Cycle Qualification Test Report

for

Air Supply Unit
P/N 0-101741

for

Bay Area Rapid Transit District
Contract 42FA-110

for

Bombardier Transportation

Mattei Transit Engineering
9635 Liberty Road, Suite E
Randallstown, MD 21133
Phone: 410 521-7020
Fax: 410 521-7024
www.matteicomp.com

DOCUMENT REVISION RECORD

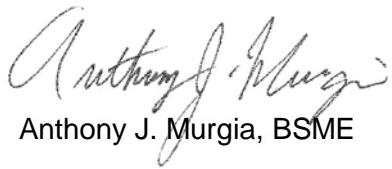
Revision Number	Revision	Date
00	Initial Release	March 22, 2017
01	Test Status Updated	November 16, 2017
02	Test Status Updated	November 20, 2018

Prepared by:


Bruce L. Berlage, Jr., BSME

Date: March 22, 2017

Approved by:


Anthony J. Murgia, BSME

Date: March 22, 2017

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1 Introduction and Scope

This report documents the results to date of the Life-Cycle qualification test conducted on the Air Supply Unit being supplied by Mattei Transit Engineering for the vehicles procured under the Bay Area Rapid Transit District contract 40FA-110. The document is provided as CDRL D030 in response to Bombardier Technical Requirements Document 071-TRD-02-DE-0902, revision 0.

The initial functional test of the Unit was completed on July 30th, 2015 at the Mattei factory in Randallstown, MD. The Life-Cycle Qualification test was started outdoors on August 3rd, 2015 at the Mattei factory in Randallstown, MD. Photos of the test set up are shown in Appendix A.

1.1 Reference Document

- Test Procedure: Q-ASU-025P-04

2 Summary

The Air Supply Unit is being tested to verify performance over a five-year period when operating at two defined duty cycles (average and 150% of average).

The equipment has operated correctly under these conditions, except as noted below.

3 Test Results

The test results are as follows:

3.1 Operational Duration to Date

So far, the Unit Under Test (UUT) has been running from July 30th, 2015 to November 20th, 2017 with stops for maintenance, FMI implementation, weekends and holidays.

This has resulted in a total of 7,033 operational hours.

Multiplying this value by 1.25 to factor in the increased duty cycles on alternate days, this equates to 8,791 operational hours.

3.2 Expected Finish Date

The duration of the life-cycle test is calculated as follows

$$\text{Test Duration} = 5 \text{ years} * 365 \text{ days/year} * 10 \text{ hours/day} = 18,250 \text{ hours}$$

The balance of time remaining for the test is $18,250 - 8,791 = 9,458$ hours

Given that the unit runs the equivalent of 141 hours/week, and assuming no additional issues are encountered, the expected finish date is March 3, 2020 (in approx. 67 weeks).

3.3 Issues Encountered to Date

So far, there have been four different types of issues:

1. The UUT aftercooler fan relay welding closed on two occasions, causing the fan to run continuously. This was corrected by a FMI to replace the electro-mechanical relay with a solid-state relay and to add a fly-back diode. These changes were implemented fleet wide.
2. The UUT compressor exhausting oil vapor out of the dryer purge ports. This was addressed by a FMI to add a discharge valve in the unit. This change was implemented fleet wide.
3. The UUT shut down after failing to pump up to the minimum pressure level. This was corrected by re-adjusting the discharge valve.
4. The UUT compressor's oil level falling below the minimum level but still visible in the sight glass after 2 months of operation. This was addressed by a FMI to increase the setting of the minimum pressure valve in the unit. This change is being implemented fleet wide.

3.4 Oil Sampling Test Results to Date

So far, there have been three oil tests:

- November 4th, 2015 – Oil condition was acceptable for duration but no longer serviceable due to abnormal and/or sever wear. See Appendix B for test report.
- February 15th, 2017 - Oil condition was acceptable and suitable for further service. Wear rates were normal. See Appendix B for test report.
- May 9th, 2017 - Oil condition was acceptable and suitable for further service. Wear rates were normal. See Appendix B for test report.
- November 27th, 2017 - Oil condition was acceptable and suitable for further service. Wear rates were normal. Compressor was at 1800 hour maintenance interval so oil was drained and changed. See Appendix B for test report

Appendix A – Test Set up Photos











CAUTION
High Voltage





Appendix B – Oil Test Results



CONTAMINATION	ABNORMAL
OIL CONDITION	NORMAL
WEAR	SEVERE

MATTEI COMPRESSORS--OEM
9635 LIBERTY ROAD SUITE E
RANDALLSTOWN, MD 21133
ATTN: MARTY WARD

41X0HA-2014 - Compressor

Unit Make : MATTEI	Date Rec'd : Nov 6, 2015	Sample Date : Nov 4, 2015
Unit Model : RVM20	Serial No : 41X0HA-2014	Time on Unit : 1550 hrs
Comp Make : {n/a}	Cust. Ref No. : {n/a}	
Comp Model : {n/a}	Stub No. : AN-23784	Diagnostician : Doug Bogart

RECOMMENDATION

We recommend that you drain the oil and perform a filter service on this component if not already done. We advise that you inspect for the source(s) of wear. We recommend an early resample to monitor this condition.

Sample Date			Current	UOM
Time on Unit			1550	hrs
Time on Oil			1530	hrs
Time on Fltr			1550	hrs
Oil Maint.			not chg	---
Filter Maint.			n/a	---

CONTAMINATION

Elemental level of silicon (Si) above normal indicating ingress of seal material.

Sample Date			Current	Abn
Silicon			81	25
Potassium			0.0	20
Water (%)			0.081	0.1
Boron			0.0	---
Barium			0.0	---
Calcium			1.6	---
Magnesium			3.7	---
Molybdenum			0.0	---
Sodium			205	---
Zinc			432	---

OIL CONDITION

Oil Type: ANDEROL 471

The condition of the oil is acceptable for the time in service. The oil is no longer serviceable as a result of the abnormal and/or severe wear.

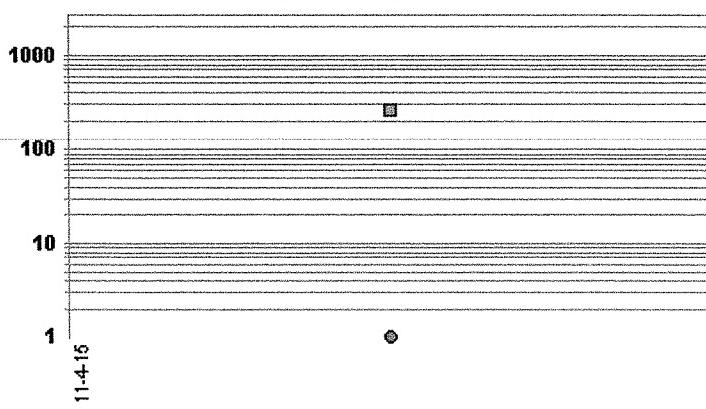
Sample Date			Current	Base
Phosphorus			2433	---
Sulfur			1171	---
Visc 40°C (cSt)			53.95	---
Visc 100°C (cSt)			---	---
AN (mg/KOH/g)			2.11	---

WEAR

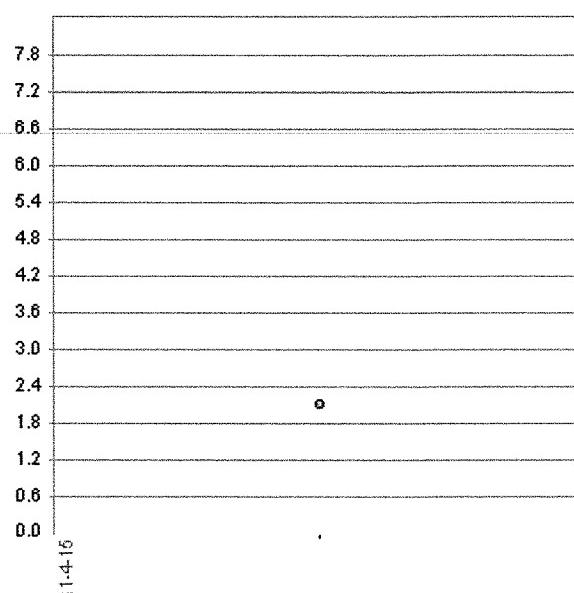
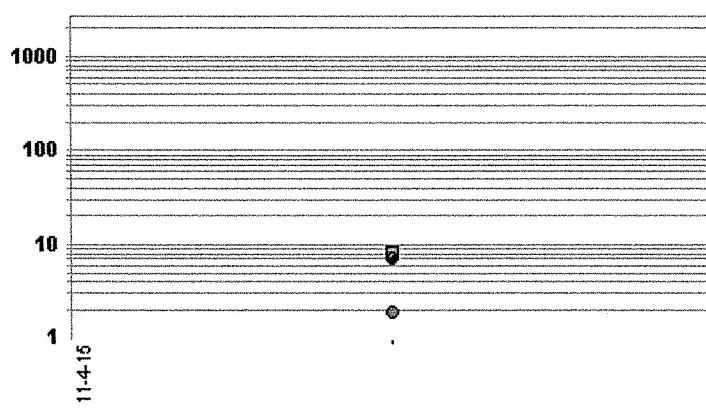
The iron level is severe. High concentration of visible metal present.

Sample Date			Current	Abn
PQ			---	---
Iron			266	50
Nickel			0.8	---
Chromium			0.4	10
Titanium			0.0	---
Copper			7.2	50
Aluminum			8.4	25
Tin			1.9	15
Lead			0.6	25
Cadmium			0.0	---
Manganese			2.0	---
Vanadium			0.0	---

Graphs

Ferrous Alloys ■ IRON ● CHROMIUM ▲ NICKEL ○ TITANIUM

TAN Level

**Babbitts** ■ ALUMINUM ● COPPER ▲ LEAD ○ TIN

Viscosity @ 40°C

If you have any questions concerning this sample report (work order no 03859224) please call 1-866-763-6741



ATTN: MARTY WARD
MATTEI COMPRESSORS--OEM
9635 LIBERTY ROAD SUITE E
RANDALLSTOWN, MD 21133
(410)521-7020
FAX (410)521-7024



CONTAMINATION	MARGINAL
OIL CONDITION	NORMAL
WEAR	NORMAL

MATTEI COMPRESSORS--OEM
 9635 LIBERTY ROAD SUITE E
 RANDALLSTOWN, MD 21133
 ATTN: MARTY WARD

41X0HA-2014 - Compressor

Unit Make : MATTEI	Date Rec'd : Feb 17, 2017	Sample Date : Feb 9, 2017
Unit Model : RVM20	Serial No : 41X0HA-2014	Time on Unit : 3000 hrs
Comp Make : {n/a}	Cust. Ref No. : {n/a}	
Comp Model : {n/a}	Stub No. : AN-24499	Diagnostician : Jonathan Hester

RECOMMENDATION

The oil change at the time of sampling has been noted. Resample at the next service interval to monitor.

Sample Date		11/04/15	Current	UOM
Time on Unit		1550	3000	hrs
Time on Oil		1530	1435	hrs
Time on Fltr		1550	1435	hrs
Oil Maint.		not chg	changed	---
Filter Maint.		n/a	n/a	---

CONTAMINATION

Elemental level of silicon (Si) above normal.

Sample Date		11/04/15	Current	Abn
Silicon		81	27	25
Potassium		0.0	0.6	20
Water (%)		0.081	0.038	0.1
Boron		0.0	0.0	---
Barium		0.0	0.0	---
Calcium		1.6	1.0	---
Magnesium		3.7	0.0	---
Molybdenum		0.0	0.0	---
Sodium		205	9.3	---
Zinc		432	5.3	---

OIL CONDITION

Oil Type: V-LIFE PREMIUM

The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

Sample Date		11/04/15	Current	Base
Phosphorus		2433	1319	---
Sulfur		1171	18	---
Visc 40°C (cSt)		53.95	82.99	---
Visc 100°C (cSt)		---	---	---
AN (mg/KOH/g)		2.11	0.203	---

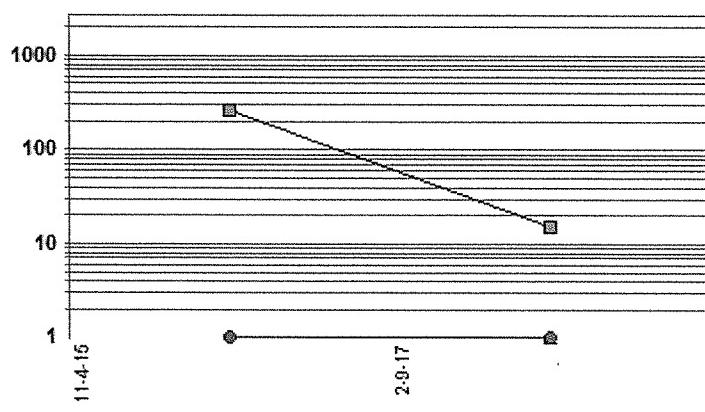
WEAR

All component wear rates are normal.

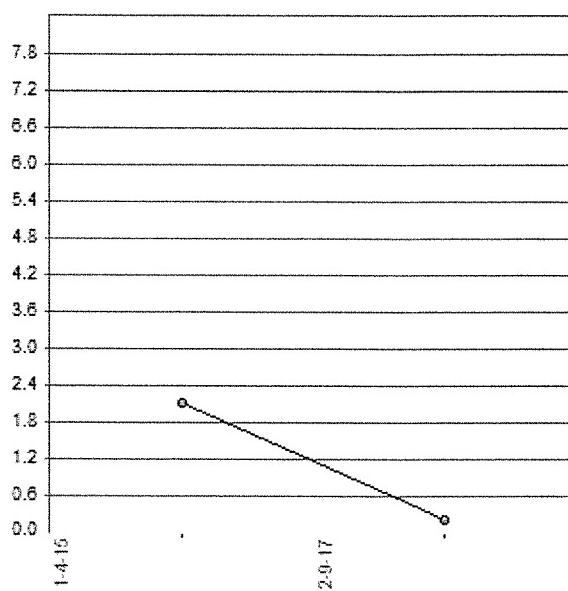
Sample Date		11/04/15	Current	Abn
PQ		---	---	---
Iron		266	15	50
Nickel		0.8	0.0	---
Chromium		0.4	0.1	10
Titanium		0.0	0.0	---
Copper		7.2	1.4	50
Aluminum		8.4	4.4	25
Tin		1.9	0.0	15
Lead		0.6	0.0	25
Cadmium		0.0	0.0	---
Manganese		2.0	1.0	---
Vanadium		0.0	0.0	---

Graphs

Ferrous Alloys ■ IRON ● CHROMIUM ▲ NICKEL ○ TITANIUM

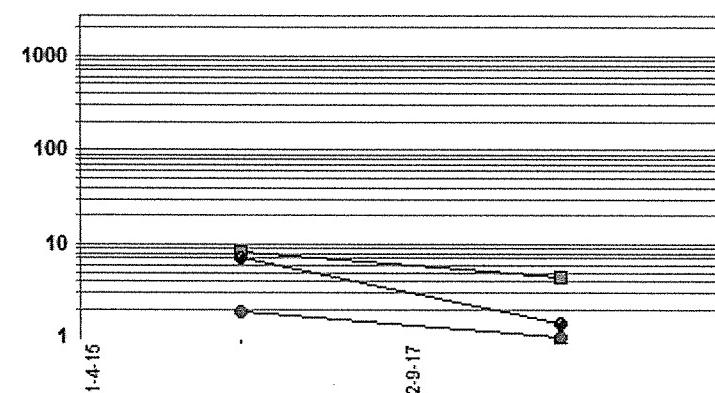


TAN Level

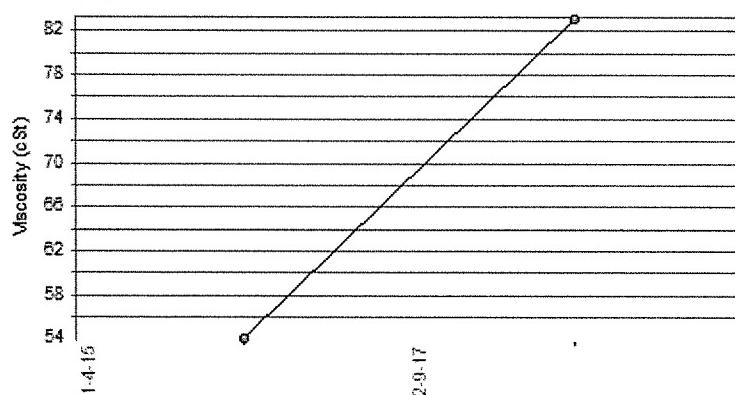


Babbitts

■ ALUMINUM ● COPPER ▲ LEAD ○ TIN



Viscosity @ 40°C



If you have any questions concerning this sample report (work order no 04165750) please call 1-866-763-6741



ATTN: MARTY WARD
MATTEI COMPRESSORS--OEM
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(410)521-7020
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CONTAMINATION	NORMAL
OIL CONDITION	NORMAL
WEAR	NORMAL

MATTEI COMPRESSORS--OEM
9635 LIBERTY ROAD SUITE E
RANDALLSTOWN, MD 21133
ATTN: MARTY WARD

41X0HA-2014 - Compressor

Unit Make : MATTEI	Date Rec'd : May 12, 2017	Sample Date : May 9, 2017
Unit Model : RVM20	Serial No : 41X0HA-2014	Time on Unit : 4066 hrs
Comp Make : {n/a}	Cust. Ref No. : {n/a}	
Comp Model : {n/a}	Stub No. : AN-24273	Diagnostician : Doug Bogart

RECOMMENDATION

Resample at the next service interval to monitor.

Sample Date	11/04/15	02/09/17	Current	UOM
Time on Unit		1550	3000	4066
Time on Oil		1530	1435	528
Time on Fltr		1550	1435	528
Oil Maint.		not chg	changed	not chg
Filter Maint.		n/a	n/a	n/a

CONTAMINATION

There is no indication of any contamination in the component.

Sample Date	11/04/15	02/09/17	Current	Abn
Silicon		81	27	18
Potassium		0.0	0.6	0.4
Water (%)		0.081	0.038	0.038
Boron		0.0	0.0	0.1
Barium		0.0	0.0	0.0
Calcium		1.6	1.0	0.2
Magnesium		3.7	0.0	0.2
Molybdenum		0.0	0.0	0.0
Sodium		205	9.3	3.3
Zinc		432	5.3	1.4

OIL CONDITION

Oil Type: V-LIFE PREMIUM

The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

Sample Date	11/04/15	02/09/17	Current	Base
Phosphorus		2433	1319	1362
Sulfur		1171	18	117
Visc 40°C (cSt)		53.95	82.99	83.25
Visc 100°C (cSt)		---	---	---
AN (mg/KOH/g)		2.11	0.203	0.180

WEAR

All component wear rates are normal.

Sample Date	11/04/15	02/09/17	Current	Abn
PQ		---	---	---
Iron		266	15	9.0
Nickel		0.8	0.0	0.0
Chromium		0.4	0.1	0.1
Titanium		0.0	0.0	0.0
Copper		7.2	1.4	0.8
Aluminum		8.4	4.4	1.9
Tin		1.9	0.0	0.0
Lead		0.6	0.0	0.1
Cadmium		0.0	0.0	0.0
Manganese		2.0	1.0	0.2
Vanadium		0.0	0.0	0.0

Graphs

Ferrous Alloys

IRON CHROMIUM NICKEL TITANIUM

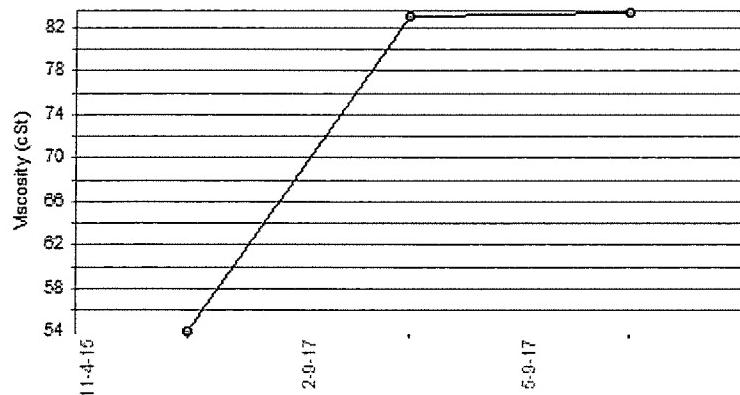
Date	Iron	Chromium	Nickel	Titanium
11-4-16	~150	~1	~1	~1
2-9-17	~15	~1	~1	~1
5-9-17	~10	~1	~1	~1

Babbitts

ALUMINUM COPPER LEAD TIN

Date	Aluminum	Copper	Lead	Tin
11-4-16	~10	~2	~2	~2
2-9-17	~5	~1	~1	~1
5-9-17	~2	~1	~1	~1

Viscosity @ 40°C



If you have any questions concerning this sample report (work order no 04221552) please call 1-866-763-6741



ATTN: MARTY WARD
MATTEI COMPRESSORS--OEM
9635 LIBERTY ROAD SUITE E
RANDALLSTOWN, MD 21133
(410)521-7020
FAX (410)521-7024



Machine Id

41X0HA-2014

Component

MATTEI RVM20 Compressor

Fluid

V-LIFE PREMIUM (--- GAL)**RECOMMENDATION**

Resample at the next service interval to monitor.

Test	UOM	Method	Limit/Abn	Current	History1	History2
Sample Number				AN24159	AN24273	AN24499
Sample Date				27 Nov 2017	09 May 2017	09 Feb 2017
Machine Age	hrs			4978	4066	3000
Oil Age	hrs			1440	528	1435
Filter Age	hrs			1440	528	1435
Oil Changed				Changed	Not Changd	Changed
Filter Changed				N/A	N/A	N/A
Sample Status				NORMAL	NORMAL	MARGINAL

WEAR

All component wear rates are normal.

Iron	ppm	ASTM D5185	>50	5.1	9.0	15
Chromium	ppm	ASTM D5185	>10	0.0	0.1	0.1
Manganese	ppm	ASTM D5185		0.1	0.2	1.0
Nickel	ppm	ASTM D5185		0.0	0.0	0.0
Titanium	ppm	ASTM D5185		0.0	0.0	0.0
Silver	ppm	ASTM D5185		0.0	0.0	0.0
Aluminum	ppm	ASTM D5185	>25	1.2	1.9	4.4
Lead	ppm	ASTM D5185	>25	0.0	0.1	0.0
Copper	ppm	ASTM D5185	>50	0.8	0.8	1.4
Tin	ppm	ASTM D5185	>15	0.0	0.0	0.0
Vanadium	ppm	ASTM D5185		0.0	0.0	0.0
White Metal	scalar	Visual	NONE	NONE	LIGHT	LIGHT
Babbitt	scalar	Visual	NONE	NONE	NONE	NONE

CONTAMINATION

There is no indication of any contamination in the component.

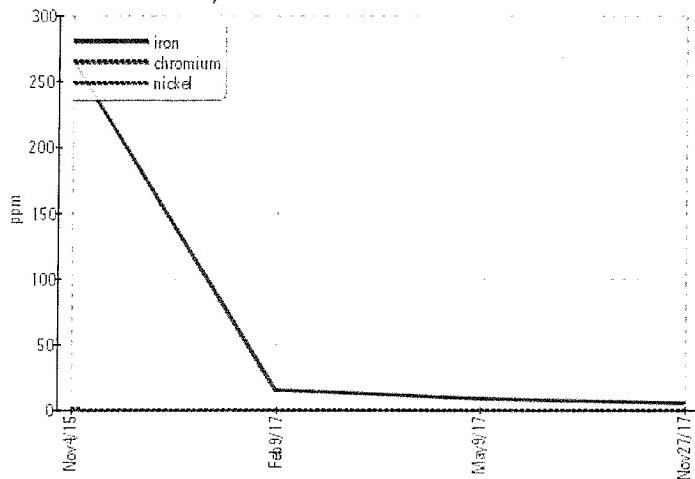
Silicon	ppm	ASTM D5185	>25	6.8	18	27
Potassium	ppm	ASTM D5185	>20	0.3	0.4	0.6
Water	%	ASTM D6304	>0.1	0.030	0.038	0.038
ppm Water	ppm	ASTM D6304	>1000	300	380	380
Silt	scalar	Visual	NONE	NONE	NONE	NONE
Debris	scalar	Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	Visual	NONE	NONE	NONE	NONE
Appearance	scalar	Visual	NORML	NORML	NORML	NORML
Odor	scalar	Visual	NORML	NORML	NORML	NORML
Emulsified Water	scalar	Visual	>0.1	NEG	NEG	NEG

FLUID CONDITION

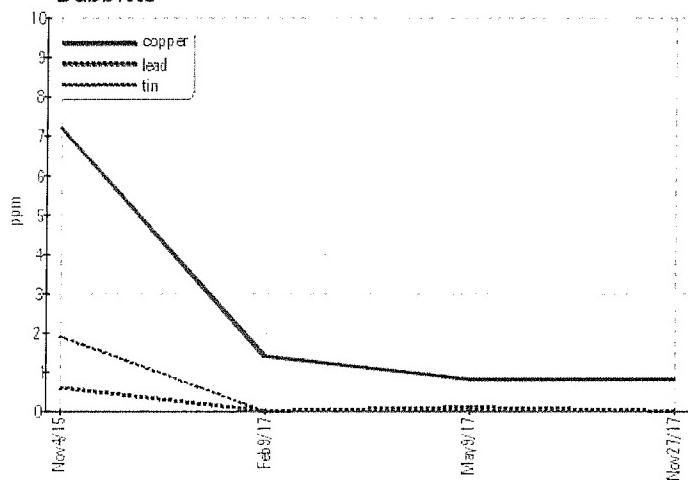
The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

Sodium	ppm	ASTM D5185		3.1	3.3	9.3
Boron	ppm	ASTM D5185		0.0	0.1	0.0
Barium	ppm	ASTM D5185		0.0	0.0	0.0
Molybdenum	ppm	ASTM D5185		0.0	0.0	0.0
Magnesium	ppm	ASTM D5185		0.0	0.2	0.0
Calcium	ppm	ASTM D5185		0.0	0.2	1.0
Phosphorus	ppm	ASTM D5185		1277	1362	1319
Zinc	ppm	ASTM D5185		0.8	1.4	5.3
Sulfur	ppm	ASTM D5185		244	117	18
Acid Number (AN)	mg KOH/g	ASTM D974		0.238	0.180	0.203
Visc @ 40°C	cSt	ASTM D445		81.52	83.25	Page 2 of 2

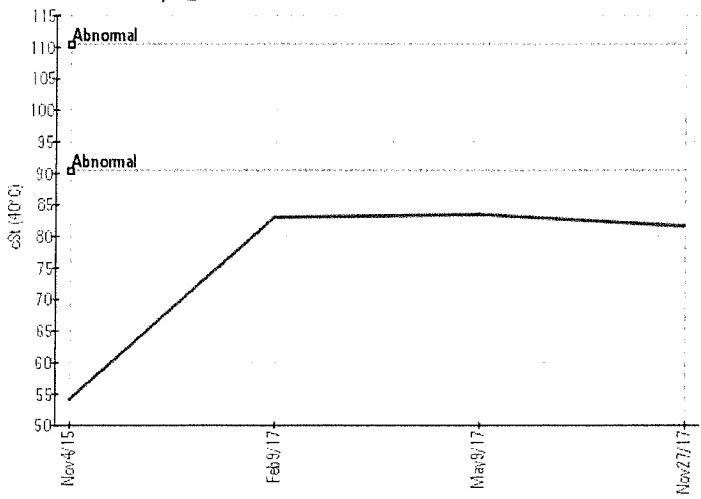
Ferrous Alloys



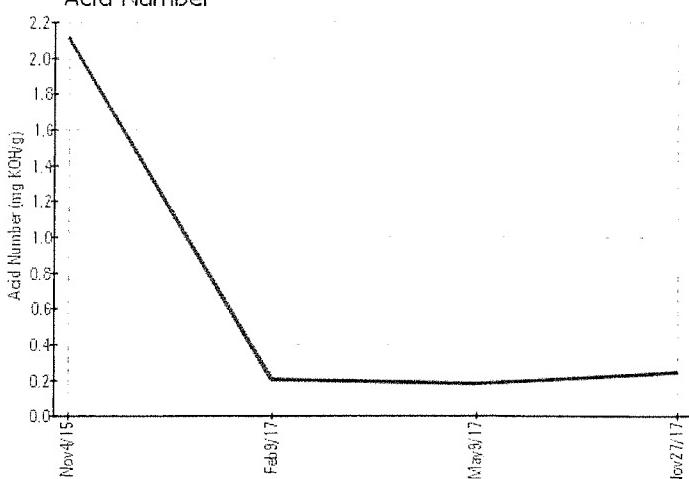
Babbitts



Viscosity @ 40°C



Acid Number



Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : AN24159 Received : 13 Dec 2017
Lab Number : 04367163 Diagnosed : 15 Dec 2017
Unique Number : 8030797 Diagnostician : Jonathan Hester
Test Package : IND 2

To discuss diagnosis or test data, contact Technical Support at 1-800-237-1369.
To change component or sample information, contact Customer Service at 1-800-237-1369.

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